

SUMMARY - CURRENT OUTSTANDING MAJOR TECHNICAL PROBLEMS, J11D-20 ENGINE 6 DECEMBER 1961

Notes

1. References are listed to indicate approximate chronological history of problem activity since surfacing.
2. The division of problems into categories of reliability, performance, controls and durability for the purpose of orderly presentation obviously leads to some overlap and conflict between categories. For instance, control problems certainly affect reliability and performance.
3. Many detailed problems are excluded.
4. Many problems heretofore resolved or close to resolution are excluded.
5. All additive and airframe ejector not being intimate with the engine are excluded.

Problem	References Item No. Date	Present Status	POW Confidence Relative to 9/11/61	Remarks/Action
A. Reliability:				
1. Hydraulic Pump	OIC-1572 OIC-1726 OIC-1823,4 OIC-1987 OIC-3040 OIC-2234,5 OIC-2709	4/17/61 5/22/61 4/19/61 5/2/61 5/3/61 5/5/61 11/24/61	Incessive piston/bore wear still encountered at fuel temperatures above 200°F. Reliability at sea level also questionable.	No change-low POW design for alternate centrifugal pump in process
2. Hydraulic System Flow Dynamics	OIC-1726 OIC-2647	5/22/61 11/16/61	Piping ruptures experienced due to severe and rapid pressure fluctuations.	Not Identified on 9/11/61 ID-2 investigating and testing methods of damping.
3. Plumbing - Mechanical Fittings	OIC-1823 OIC-1987 OIC-2234,5 OIC-2709	6/19/61 5/2/61 5/5/61 11/24/61	Initial hardware deliveries now being assembled into PL-114, PL-115.	Decreased Item 2 coupled with new untested fittings has decreased confidence. To be tested on PL-114.

Problem	Reference Item No. Date	Present Status	NSI Confidence Relative to 9/11/61	Remarks/Action
Approved For Release 2002/10/30 : CIA-RDP81B00879R001000070094-5				
5. Take-Off Performance	OKC-2706, 9 OKC-2733	11/24/61 11/30/61		
1. Turbine Profile - Burner Cans	OKC-1572 OKC-2235 OKC-2420	4/17/61 9/1/61 10/10/61	Until very recently this problem reflected a normal continuous development effort to improve temperature profile for 1900° operation. In this basic existing bill of material hardware represented an 1850° capability which reflected a 9 to 10% thrust deficiency entirely within the initial 12 limited engine requirements. During late November exploratory testing triggered by an unacceptable combustion upset experienced earlier on engine FX-113 revealed additional evidence of this upset. Since then further testing has confirmed this and revealed an unacceptable 600°F spread from nominal average turbine inlet temperature.	Changing day to day Primary effort involving up and down. Fluid FX-111, FX-113, 15-1, Testing. A day to day process of gas path configuration change followed by test to isolate by elimination the factor or factors responsible for the upset.
2. Afterburner Performance	OKC-1473 OKC-1474 OKC-1572 OKC-2647 OKC-2706, 9	3/24/61 3/22/61 4/17/61 11/16/61 11/24/61	Bill of material four ring sprayer is 5% deficient in augmentation	Not established on 9/11/61 FX-113 currently testing five ring sprayer in effort to improve augmentation.
3. Compressor Matching and Efficiency	OKC-1572 OKC-1523, 4 OKC-1907 OKC-2260 OKC-2295 OKC-2709	4/17/61 4/19/61 8/2/61 8/2/61 9/1/61 11/24/61	Current deficiency during bleed closed operation is due to 3.5% airflow deficiency and 2 1/2% compressor efficiency deficiency.	Not defined on 9/11/61 Problem deep rooted in existing rotor hardware geometry. Probably requires downstream retrofit for correction.
4. Thrust Balance and Turbine Cooling Airflow	OKC-1987 OKC-2275 OKC-2709	8/2/61 9/1/61 11/24/61	Compressor air bleed for number two bearing thrust balance and turbine cooling is greater than originally anticipated resulting in an estimated 5% performance deficiency.	Not defined on 9/11/61 Problem deep seated, a probable retrofit required. Exact degree of deficiency not established.
5. Turbine Matching and Efficiency			Test results indicate turbine efficiency down 1.5 to 2% from calculated values.	Not defined on 9/11/61 Problem may require downstream retrofit for resolution.

Problem	References Issue No.	Date	Approved For Release By: [Signature]	Comments	Contractor Confidence Relative to 7/11/61	Remarks/Action
1. Controls: Pratt & Whitney 1. Valve and Piston Seizures	OKC-1298 OKC-1479, 80 OKC-1572 OKC-1726, 7 OKC-1823, 4 OKC-1987 OKC-2040 OKC-2235 OKC-2341	2/7/61 3/20/61 4/17/61 5/24/61 6/19/61 8/2/61 8/3/61 9/1/61 9/26/61		Until controls are delivered and engine tested which incorporate 100% hardened surfaces, this problem will continue to exist. Very current engine tests indicate promise.	No change confirmed	Initial production units with 100% hardened surfaces scheduled for mid December delivery.
2. Speed Schedule Inconsistency (a) Gear (b) Startup Starts (c) Military Speed Hysteresis	OKC-1479, 80 OKC-1823 OKC-1987	3/21/61 4/19/61 8/2/61		Although improvements have been and continue to be made, because of the seizure problem engine test evaluation has been limited.	No change confirmed	Test evaluation to commence with the 100% hardened surface hardware.
3. Reheat Nozzle Control Instability	OKC-1479 OKC-1987 OKC-2235, 5	3/24/61 8/2/61 9/5/61		Very current engine testing has revealed improvement, however this is preliminary. More testing required to raise confidence.	No change confirmed	Initial production units scheduled for December delivery incorporate interim fix of increased damping. Final resolution hinges on redesign of four way pilot valve.
1,2,3 Same as above	OKC-1479, 80 OKC-2477 OKC-2485 OKC-2545 OKC-2587 OKC-2696	3/24/61 10/19/61 10/23/61 10/29/61 11/6/61 11/15/61		Design efforts and bench testing indicate potential improvements.	Increased	Realistic evaluation depends on engine test.
4. Casting Quality	OKC-2751	12/4/61		Initial production hardware schedules suffer from quality of castings received during the summer 1961	Increased	Current casting deliveries show improved quality. Accelerated vendor coordination should eliminate problem for March 1962 finished control

Problem	Reference Name No. Date	Approved For Release 2002/10/30 : CIA-RDP81B00879R001000070094-5	OCEP/7 Present Status	At Confidence Relative to 9/11/61		Remarks/Action
				Initial	Final	
2. Durability:						
1. Turbine Blades	OEC-1572	4/17/61	Although this problem implicitly covered under performance, no change (9,1), extended blade life as dictated by corrosion at 1900° F is questionable.	No change	Continuous effort to reduce corrosion.	
2. Compressor Rotor	OEC-1571-2 OEC-1576-7 OEC-1579-4 OEC-1976	4/17/61 5/22/61 6/19/61 7/25/61	Redesigned rotor incorporating bolted rim dampers and improved quality discs now assembled into FK-114, being assembled into FK-115.	No change confirmed	Realistic increase in confidence hinges on test confirmation on FK-114 and 115 to be ready for test in December.	
3. Turbine Rotor	OEC-1493 OEC-1726 OEC-1823 OEC-1906 OEC-2041	3/24/61 5/22/61 6/19/61 7/25/61 9/26/61	Rotor speed currently limited because of waspailly discs. Astralloy discs will lift limitation.	No change	Initial sample of astralloy discs targ. x for 77 Y engine reveal improved quality. Inspection to date incomplete.	
4. Compressor Air Seal Diaphragms	OEC-2709	11/24/61	50 hour tests on FK-112, 115 revealed design deficiency.	Not established as 9/11/61	Redesign underway.	
5. Gearsboxes	OEC-1573 OEC-1577 OEC-2709	6/19/61 3/2/61 11/24/61	50 hour test has revealed fair durability for the initial steel remote box. Increased stiffness misalignment requirements were not tested. Titanium gearbox not tested to date.	Increased prior to new misalignment requirements.	Investigation underway for increased misalignment.	
6. General Engine	OEC-2709	11/24/61	FK-115 50 hour test results fairly good. FK-112 50 hour test results not so good.	Some increase	Push more testing required to establish flight-worthiness.	
7. Engine Out - Heat Rejection	OEC-0598-40	5/26/60	Possible engine seizure after flame out without adequate cooling.	Not applicable.	Problem deferred to flight test phase.	